REPORT

ON THE

FORESTS OF KHOORDAH, ORISSA.

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CONTENTS.

		Page.
Chapter I.	—General description	1
,, II.	—Forest history, rules and notifications	16
,, III.	—General proposals for working	31
,, IV.	—Establishment and financial prospects	35

CHAPTER I.

GENERAL DESCRIPTION.

1. *Situation.*—The Khoordah sub-division of the Pooree district consists of an area of 943 square miles in the western part of that district. It is bounded on the *north* by the district of Cuttack, on the *east* by the Pooree district approximately represented by the Daya river, on the *south* by the Chilka lake and the Ganjam district of Madras, and on the *west* by the Tributary States of Nyagarh, Ranapur, Khandapara and Banki, the latter under British management by means of a Tehsildar. There are also a few detached villages in Pooree and the zillah of Balbhadrapur on the sea side of the Chilka lake. It contains a population of about 281,000 souls.

2. *Configuration of the ground.*—Near the Pooree boundary the land is flat and alluvial, the rest of the country consists of ranges and isolated peaks, separated by flat or undulating land. These peaks rise in the south-west corner to a maximum height of 3,900 feet. The chief of these peaks is Khandahana, 3,200 feet, and among other hills the most noticeable are the Bhalari Range on the Madras frontier, the Suleri group near Sonakalla and the Chilka lake, the Rutenmala Range between Jenkia and Tangi and the Baruni Hill near the town of Khoordah. None of these hills are cultivated, but most of them are rocky peaks, usually steep and covered with jungle.

3. *Climate.*—The temperature varies from about 55° in the cold season to 110° in the hot weather; it is comparatively equable, the hot winds only lasting a short time and the rainy season for about four months. The average rainfall is 65 inches. There is no frost.

4. The chief winds are during the hot weather from the south-west, and from the east during the monsoon. They are rarely very strong and seldom do any damage.

5. *Geology.*—The hills consist principally of metamorphic rocks, in various forms of gneiss, mica schist, hornblende schist and quartzite, the gneiss often passing into a form of very hard rock, such as may be seen near the Chilka lake, resembling granite. In the northern parts of the sub-division are found sandstones and clays of the Athgarh group, including white pipe-clay, which is much exported; and the bases of the hills are usually surrounded by laterite, which covers a considerable area of the country, and is largely used for building and road-making. The soil above the laterite beds is usually scanty, but in places accumulations of sandstone detritus form a deeper soil on which the sál tree usually occurs.

6. *Lines of Export.*—The sub-division is traversed from end to end in a south-easterly direction by the Madras Trunk Road. From this road branches go off to Pooree, Banpur, Sonpur and the Mahanadi, and Banki. With these exceptions there are no made roads, but fair-weather cart tracks may be found in every direction about the country, passing from village to village and penetrating into the forests. The Chilka lake forms a means of communication between the Khoordah sub-division and portions of Pooree and Ganjam; but hardly any other water communication exists, as there are no navigable rivers, the Daya river alone being occasionally used during the rains.

7. *Rest-houses.*—The sub-division is very well provided in this respect, as there are good bungalows belonging to the Public Works Department at intervals along the Madras Trunk Road of about 10 to 12 miles. Such bungalows exist at Chandaka, Chattabar, Khoordah, Jenkia, Tangi, Sonakalla and Burcool on the Madras road; at Bagmari and Kalapathar on the Sonpur road, and on the outskirts of the sub-division, at Pipli, Sardaipur, Balwanta and Cuttack. *Camping grounds* may, without difficulty, be found all through the sub-division, most villages having topes of mango trees which may be utilized for this purpose. Travelling is easy, carts being always obtainable at cheap rates.

8. *Water-supply.*—There are numerous springs of good water all through the sub-division, except near the Chilka lake, though there is no doubt that the supply of spring-water is less than it should be with proper forest protection. The water of the lake is brackish, but that of the small rivers is good. Tanks are also found near every village. The water of the streams is much used to irrigate the fields, and in some places, such as Majana, valleys have been closed by bunds so as to ensure a permanent supply. Irrigation by wells is not common.

9. *Maps.*—Khoordah is well supplied with maps. For the settlement which is now being completed, *cadastral sheets on a scale of* 32 *inches to one mile* are being prepared for all villages except those in the Banpur and Aurung mâls. These maps show every field and all possible topographical details. They are now being printed. *A map on the scale of four inches to one mile* is also nearly ready, being a reduction from the larger scale. This map will be very useful for forest purposes if it is published. At present it only exists on tracing cloth, but is well worth being photozincographed and a large number of copies made available to the public. For forest purposes it will be more generally useful at present than the 32-inch sheets, which are very unwieldy, and I fully endorse Mr. Taylor's recommendations as to its publication. It should be said that the Banpur and Aurung mâls have also been surveyed topographically, so as to complete the map of Khoordah on the four-inch scale. The old *revenue survey maps on the scale of one inch = one mile*, by Lieutenant H. L. Thuillier, dated 1837-41, are in print and published by the Surveyor-General's Office. They are very incorrect, vague, and show no limits to the areas under cultivation, to villages or to forests, and have even the hills either roughly sketched in or altogether absent. They are thus almost useless. But I believe it is under contemplation to reduce the present survey map still more, so as to give a reliable one inch = one mile map which will be very useful. The *Pooree district map on the four miles = one inch scale*, as well as the *Atlas sheets Nos.* 107, 116 showing Khoordah, are only reductions from Lieutenant Thuillier's survey and are merely correct in general features.

10. *Sub-divisions.*—The Khoordah territory is divided into 11 zillahs, viz.,—

1.	Dandimâl	chief place	Darootang.
2.	Khoordah	„ „	Jagarsing. (Khoordah station).
3.	Haldia	„ „	Haldia.
4.	Kuspâla	„ „	Kuspâla.
5.	Manikgora	„ „	Bollgarh.
6.	Panchgarh	„ „	Manibund.
7.	Rameswar	„ „	Rameswar.
8.	Tappung	„ „	Tappung.
9.	Kohori	„ „	Kohori.
10.	Banpur	„ „	Banpur.
11.	Balbhadrapur	„ „	Balbhadrapur.

The last, as already stated, is an isolated zillah between the Chilka lake and the sea. Tappung zillah has been made over for the revenues of the Temple of Jagannath at Pooree. Zillah Haldia and the Malipara portion of zillah Dandimâl have been made khandaiti jaghirs and settled with their respective khandaits and not directly by Government. In these four zillahs Government possesses no forest lands; the first contains no forest, while, as regards the other three, the orders of the Government of Bengal in Revenue Department letter No. 206-104LR, dated 24th January 1881, have declared that the terms on which they have been transferred preclude the Government from now claiming forest rights over them. In this place it may be useful to give Mr. Taylor's description of the Banpur mâls taken from his general report of 1871-72 as sub-divisional officer:—

"The Banpur mâls, as they are called, are a tract of hilly country with an area of about 100 square miles, lying to the north of the town of Banpur, and bounded by the Tributary Mehals of Nyagarh, Banpur, and Gumsûr. This tract of country has never been settled, and is very sparsely populated, chiefly by degenerated Khonds who have forgotten their original language, religion and customs, and who now only speak Uriya and set themselves up as Hindus of rather good caste. They pay six pice for plough to the Dalbeheras of Aurung and Champagarh and the Bisois of the Burramal and Champagarh. They also pay 'tola' on the crops gathered, and little paddy is grown, as the Khonds chiefly cultivate

dry crops on lands from which they annually burn off the jungle and forest. These 'toila' lands are seldom cultivated for more than two consecutive years, so that fresh forest has to be cut and burnt. In this way, and by the unrestricted cutting of timber for sale in Ganjam and Pooree, immense quantities of valuable timber have been destroyed or carried off, and very little good timber now remains."

11. In the remaining seven zillahs the forest lands are the property of Government and have consequently been declared to be "protected forests" in a notification dated the 9th August 1880, which is worded as follows:—

"It is hereby notified that the Lieutenant-Governor has been pleased to declare the provisions of Chapter IV of the Indian Forest Act, 1878, to be applicable to all forest and waste lands in the Government estate of Khoordah, in the district of Pooree, excepting such lands as have been confirmed as revenue-free or settled with cultivators or others, and such lands as shall during the course of the revenue settlement now in progress or thereafter be so settled."

12. *Forest growth.*—There is very little difference in the condition of the forest growth in the different areas which make up the protected forests. The only shades of difference particularly noticeable are that, in certain localities on a sandy soil, sál occurs gregariously; in others, bamboo forms the prevailing crop; while on the poor lateritic soils a dense growth of small trees and thorns is characteristic. Between these three classes, if classes they can be rightly called, every intermediate can be found; but except in certain definite localities sál is scarcely ever observable. The whole of the existing forest crop of Khoordah is small, the growth stunted and bad, and the reproduction at present deficient. In a few isolated cases in the more remote parts of Banpur, on the Nyagarh boundary, a few acres of forest of larger sized trees occur, but scarcely at most more than 3,000 acres. These trees are sál and piasál.

13. But the forests may be classified generally and more usefully into two categories:—

1*st.*—The large blocks, mostly covering hill ranges or isolated hills, including the compact sál areas.

2*nd.*—The village forest lands which comprise the scrub-jungle which lies on the high lands between the villages, and is cut up in every direction by patches of cultivation, wherever land fit for cultivation has been found.

The second category will always be expected to provide the material required for ordinary village purposes on the estate, while the former might with advantage be considered as the reserve stock which must be looked to to supply eventually the more extraordinary village demands and be available for export beyond the estate limits.

14. The present condition of these tracts is very poor indeed. Those referred to in the second category present usually the aspect of tracts of nearly bare rock just covered with clumps and thickets of vegetation, principally thorns and climbers. The number and variety of thorny bushes is quite astonishing, and is probably unlike anything else to be seen in any other part of Bengal. The chief of these thorns, erect and climbing, are the species of *Carissa, Zizyphus, Gardenia, Flacourtia, Capparis, Mimosa, Acacia, Cæsalpinia, Plecospermum, Randia, Pisonia,* and *Olax,* the whole usually intertwined with each other and with creepers of many kinds, and chiefly the common *Combretum decandrum.*

15. This bushy scrub does not cover the country regularly, but is principally arranged in patches of some feet in breadth separated, by bare grassy spots. This is the result of long grazing. Cattle cannot penetrate the thorny masses, and so, when once a small opening is made, it is gradually enlarged by browsing, and other jungle growth prevented from coming up. It would be wrong to say that there were no trees, for shoots of trees of small size are abundant and are capable of growing. The principal trees thus met with on the poor level lands near the villages are species of *Diospyros, Streblus, Limonia, Œgle, Cipadessa, Adina, Stephegyne, Strychnos, Casearia, Cassia, Alangium, Phyllanthus,* and *Erythrina,* all hardy and resisting for long the knife of the wood-cutter as well as the browsing of the goats and cattle, until a chance occurs for them to take such a start upwards as will place them in more favourable condition for growth into trees. In some localities, as the

result of constant and continued grazing by large herds of cattle, even the thorns themselves are browsed down to a foot or two from the ground, forming round, thorny, dense masses, which afford little hope of ever being resuscitated except under some very strong remedy.

16. On much of the flat land below the hill ranges the bamboo is extremely common, and most especially is it common in zillah Kohori. The species is the thorny bamboo *Bambusa arundinacea*, but the clumps are now all small, and form in places an almost impenetrable thicket. The last general flowering of this bamboo took place in 1873-74, so that what we have now are only seedling clumps of about six or seven years old. They will before long reach a finer size and produce a better class of bamboo than they do at present. These bamboo forests are interspersed with numerous small trees or blank spaces. Their growth has been facilitated by the protection of the bamboo. Noticeable among such trees are *Terminalia belerica*, *Odina Wodier*, *Dichrostachys cinerea*, *Lagerströmia parviflora*, *Ailanthus excelsa*, *Ulmus integrifolia*, *Bombax malabaricum*, *Cochlospermum Gossypium* and several species of fig.

17. On the hill ranges and isolated hills, the cutting has been more restricted than on the level lands, and the consequence is that the tree forest is in a more promising condition. I went over the Burnai Hill near Khoordah, which has been more or less protected for some years. I found the forest growth much better than on the level lands, the tree jungle in places had reached a good height, though much hampered by thorns and climbers; but still it shows that, if carefully managed, it is capable of eventually reverting to its former condition of forest. Many other ranges are equally or even better clothed, but they still require protection. The species of tree which are usual found on these hills differ somewhat from those of the plains. I found *Pterospernum suberifolium* very common, also *Callicarpa arborea*, *Actinodaphne angustifolia*, *Saraca indica*, *Oroxylum indicum*, *Odina Wodier*, *Ailanthus excelsa*, *Memecylon edule*, and other species.

18. In the valleys of the hills and along water-courses in the plains the most common trees are *Barringtonia acutangula Diospyros Embryopteris*, *Pongamia glabra*, *Bursera serrata*, *Ixora parviflora* and *Mimusops indica*.

19. The sál forests constitute isolated areas chiefly in Dandimál, Kuspála, Manikgora and Panchgarh zillahs; they consist principally of sál poles of about 12 years of age, and their growth is principally due to the protection they have received by the local authorities and now by the notification making them reserved trees. The growth is pretty good, the average rate being 8 to 10 rings per inch of radius, and with protection for a few more years they will fill up well and make valuable blocks. The chief trees found near to or associated with sál are *Careya arborea*, *Eugenia Jambolana*, *Dalbergia latifolia*, *Terminalia tomentosa*, *Pterocarpus Marsupium*, *Lagerströmia parviflora*, *Buchanania latifolia*, *Soymida febrifuga*, *Stephegyne parvifolia*, *Adina cordifolia*, *Bassia latifolia* and *Xylia dolabriformis*.

20. This latter tree, the Arakan ironwood, forms near Chandaka a compact block of nearly pure coppice. There must formerly have been fine trees, but the forest now consists almost entirely of coppice shoots. It should be carefully protected and managed, as it will prove valuable.

Forest Products.

21. (1) *Timber.*—Sál or "Salwa" *(Shorea robusta)* is the most important tree. As already described, it forms here and there compact gregarious blocks, and in the remoter parts of Banpur zillah, forests of larger size. Its uses are well known, and it is largely sought for for house posts and cart-building when young. The older trees in Banpur are taken to Poorce across the Chilka lake, where they fetch Re. 1 to Rs. 1-8 per cubic foot according to size of log. The present Government rates are Rs. 1-8 per cart-load, or about Rs. 4-8 per tree. Small trees are not sold at present.

Piasál (*Pterocarpus Marsupium*) is found chiefly with sál, but occasionally on the hills or in the bamboo forests. Very few big trees still remain, except in Banpur. It is used for house-building and cabinet-work, and is very largely in demand. It is sold from Banpur at the same rates as sál.

Sissu (*Dalbergia latifolia*) is found almost everywhere, of small size, but not very common. Large trees occur occasionally on the hills and in Banpur. It is the chief wood in use for chairs and tables, and is of very handsome grain. The rates are the same as for sál.

Kendhu (*Diospyros Melanoxylon*) is common everywhere throughout the forests, but large trees are very scarce. A few may still be seen on Suleri Hill, and on the range between Khoordah and Ranapur. It is used for cabinet-work, but is too scarce of sufficient large size to have much heart-wood, to be much in demand. Three other species of *Diospyros* occur in the forests, the chief of which is *D. Embryopteris*.

Karam (*Adina cordifolia*) is found scattered throughout the forests, nowhere of large size. It is much sought for for house-posts and is sometimes used for furniture.

Suam (*Soymida febrifuga*) is common in the sál forests, nowhere of large size. It is valued for posts. The wood is very hard, heavy and handsome, and its growth should be encouraged.

Gambhari (*Gmelina arborea*) is occasionally found only. It is used for cabinet-work, furniture, and particularly for palkis, but is not now found of large size.

Tinia (*Albizzia Lebbek* and *procera*) is not uncommon in the forests, but is only of large size in the Banpur mâls. It is used for beams and posts for houses.

Kongora (*Xylia dolabriformis*) is found scattered through the forests. It is principally found associated with sál, and in one locality already referred to it forms a nearly pure forest, and it often occurs on the hills. The wood is very much esteemed for house-posts, and it fetches a good price, and is otherwise very valuable. It must be much encouraged.

Asan (*Terminalia tomentosa*) is also found chiefly with sál, but rarely of any size. The wood is used for posts and the bark for tanning nets.

Kasi (*Briedelia retusa*) is pretty common everywhere and is esteemed for posts.

Mahanim (*Ailanthus excelsa*) is common everywhere in the forests, and is fast growing. The wood is very light and is much used for making catamarans and masula boats. It was formerly sold at eight annas per cart-load, or about Rs. 2 per tree.

22. The above, with the addition of teak and *chhuriana*, form the trees reserved under section 29 (*a*) of the Forest Act, in notification of the 30th October 1880. Teak was included because it was proposed to plant it; and chhuriana (*Ochrocarpus longifolius*, Bth. and Hook. f.), a tree of the Malabar Ghâts, is a tree which, introduced long ago by one of the Rajahs of Khoordah and planted by him near Kohori village, on an area of about 12 acres, still survives in the state of coppice, and was thought worth preserving.

23. Of other good kinds, which have not been reserved, the chief are—

Dhau	...	*Anogeissus latifolia.*
Phansi	...	*Anogeissus acuminata.*
Bheru	...	*Chloroxylon Swietenia.*
Kuchila	...	*Strychnos Nux-vomica.*
Kotoko	...	*Strychnos potatorum.*
Bohul	...	*Mimusops Elengi.*
Nim	...	*Melia indica.*
Muria	...	*Vitex pubescens.*
Keri kadam	...	*Stephegyne parvifolia.*
Harra	...	*Terminalia Chebula.*
Kumbi	...	*Careya arborea.*
Moi	...	*Odina Wodier.*
Giringa	...	*Pterospermum suberifolium.*
Sonari	...	*Cassia Fistula.*
Khair	...	*Acacia Catechu.*

These are chiefly used for house-posts and consequently are scarce, and, when found, rarely of any size.

The smaller trees are of a great many different species and of various utility; they are usually only cut for firewood or occasionally for house-posts.

24. The thorns are very numerous in species and very common. They are taken away for fencing or, if large enough, are cut for fuel. The climbing species are particularly troublesome. The common erect growing thorny shurbs are *Carissa Carandas* and *diffusa*, *Zizyphus vulgaris*, *Capparis sepiaria*, *Flacourtia sepiaria*, and *Mimosa rubicaulis*, while *Ægle Marmelos*, *Flacourtia Cataphracta*, *Atalantia monophylla*, *Alangium Lamarckii*, *Dichrostachys cinerea*, *Randia uliginosa*, and a few others reach the size of small trees.

25. Some of the *climbers* are in much use; such are: *Combretum decandrum*, the wood of which is much esteemed for making potash for washermen's use; *Entada scandens* which is used for ropes and for caulking boats; *Croton caudatum* much used for tying rafters and temporary bamboo huts; a little *Convolvulus*, probably *C. Turpethum*, is exported for similar purposes. All these are destructive species, and to them may be added *Bauhinia Vahlii*, *Butea superba*, *Derris scandens*, *Briedelia stipularis*, and the thorny species *Cæsalpinia sepiaria*, *Acacia pennata* and *cæsia*, *Zizyphus Œnoplia*, *Toddalia aculeata*, *Pisonia aculeata*, *Plecospermum spinosum*, and others. In fact, the large preponderance of thorny species of trees, shrubs and climbers is a marked feature of the Khoordah forests, whose characteristics are probably more in alliance with the flora of Madras than with that of Bengal.

26. (2) *Bamboos.*—The common bamboo of Khoordah, and which has already been referred to, is *Bambusa arundinacea*, the thorny bamboo. As already stated, this bamboo flowered in 1873-74, and the young seedlings which succeeded have not yet reached their best development, though in the neighbouring state of Ranapur I saw some which were nearly of their full size. In the Banpur hills, one or two other species are occasionally met with, such as *Sundragai* (probably *Bambusa Tulda* which flowered in 1871-72), *Belindi* (probably *Dendrocalamus strictus*). There is a large demand for bamboos, a demand which, we may hope, will shortly be equal to the whole probable annual yield. Bamboos are at present sold on permit at 2 annas per cart-load to ryots of the Khoordah estate and 4 annas to outsiders.

27. The condition of the growth of the bamboo forests is not as good as it should be, owing to the fact that for some time in the early growth of the clumps they were regularly browsed down. Most of them have, however, now developed a large thorny thicket around them, so keeping off the cattle and allowing the larger stems to develop themselves, so that they are now pretty well assured; and the danger henceforth will be, I fear, that the bamboos will do considerable harm in places, by preventing the growth of forest trees.

28. *Canes.*—There is only one cane, *Calamus fasciculatus*, but it is common almost everywhere in the forests and under mango topes, though not often of large size, except in the more remote parts of Banpur. Passes for cane are issued at 8 annas per cart-load for ryots of the estate and Re. 1 for outsiders.

29. *Minor produce.*—The chief article of minor produce is the *gundi*, or kamela powder, the product of the *Mallotus philippinensis*, which is common in the Banpur mâls and occasionally found in other forests. This dye is chiefly exported for sale to traders in the Ganjam district. Passes for the powder are granted at Rs. 4 per cart-load; such a cart-load consists of about ten maunds, and fetches about Rs. 36 per maund in Ganjam.

30. *Achhu* bark, the produce of *Morinda tinctoria*, is occasionally exported. *Kuchila* seeds, the produce of the strychnine tree, *Strychnos Nux-vomica*, are exported. Passes for their collection are granted at 8 annas per cart-load; they sell in Cuttack at 4 annas per maund. *Osta*, the bark of *Entada scandens* is a good deal sold. Other articles of minor produce, which may occasionally be taken, are Myrabolams the produce of *Terminalia Chebula*, *T. belerica*, and *Phyllanthus Emblica*; tree cotton, the produce of *Bombax malabaricum*; cutch, the extract of the wood of *Acacia Catechu*; koronj, the oil—giving seeds of *Pongamia glabra*; mowah flowers (*Bassia latifolia*), which, however, are very rarely collected in Orissa; wax, cocoons, and medicinal plants.

31. There is also some sale for stone and earth, principally limestone, laterite, sandstone, and a white sort of pipe-clay locally called chalk.

32. *List of Forest Trees and Shrubs.*—I have endeavoured to draw up a list of such forest trees and shrubs as I met with on my tour. Owing, however, to the limited time at my disposal, I was not able to verify as accurately as I

should have wished the native names, which vary much in different parts of the country, and which are somewhat confusing to one who is unacquainted with the Uriya language. The Uriyas, too, are by no means exempt from the common failing of giving the first name, right or wrong, that comes into their heads. The list, however, is herein given, and those who refer to it must make allowances for a certain amount of doubt regarding the vernacular names. Over 200 species are enumerated, and allowing for plants not recognized, or of which the material available was insufficient for determination, and also allowing for an increase in species for the country not examined, the forest flora probably numbers about 300 species.

33. There are still a number of names out of those given in Messrs. Handley and Wylly's draft Rules which I have as yet not succeeded in identifying. A number of the species given in the list are, however, cultivated kinds, but are introduced as being commonly seen and of general interest.

34. It will be noticed from this list that the flora is more that of South India than of Bengal generally. I was surprised to find such a marked difference from that of the next province, Chota Nagpore, and more especially is the Khoordah flora distinguished by the large number of thorny plants. I have not added the plants of the river deltas which probably occur near the mouth of the Davy river and are certainly found in the coast forests of Pooree. These plants are almost identically the same as those of the Sunderbuns. Sundri, goran, pussur, keora, and such good woods are common.

35. One feature which shows the difference between these forests and others in Bengal is the absence of long grasses, consequently rice-straw is the usual thatch of the country, and not sun-grass as in Chittagong or the various jungle grasses as in Northern Bengal.

List of the Trees and Shrubs met with in the Khoordah sub-division of the Pooree district, Orissa, with their Vernacular names as far as they could be ascertained.

Name.	Uriya name.	Remarks
Dilleniaceæ—		
Dillenia indica, Linn.	Oao ..	Only seen in cultivation near Khoordah.
„ pentagyna, Roxb.	Rai ...	Not very common, and chiefly in the sál forests.
Anonaceæ—		
Polyalthia longifolia, Bth. and Hk f. ...	Devdar ...	Cultivated. Seed sown by Mr. Taylor in the forests near Khoordah has come up well.
„ suberosa, Bth. and Hk. f. ...	Lohania Mossu	
„ sp. (?)	Mossu ...	Moist localities.
Sacoopetalum tomentosum, H. f. and Th. ...	Patmossu ...	
Anona squamosa, Linn.	... ..	Cultivated.
„ reticulata, Linn.	.....	Ditto.
Uvaria sp.	Lakankuli ...	Damp places.
Capparideæ—		
Capparis horgida, Linn.	Oserwa ...	Climber, common.
„ zeylanica, Linn.	Lopra ...	Shrub, common on laterite.
„ sepiaria, Linn.	Kanta kapali ...	Thorny shrub.
Bixineæ—		
Bixa Orellana, Linn.	.....	Cultivated.
Cochlospermum Gossypium, DC.	Konto palás ...	Common on dry rocky hills.
Flacourtia Ramontchi, L'Hér.	Bah baincho ...	Small tree, common.
„ sepiaria, Roxb.	Bainchu ...	Common everywhere.
Guttiferæ—		
Ochrocarpus longifolius, Bth. and Hk. f.	Chhuriana ...	Introduced near Kohori by a former Raja, now found only in about 12 acres of coppice.
Calophyllum inophyllum, Linn.	Poonaug ...	Cultivated everywhere for the oil yielded by the fruit.
Mesua ferrea, Linn.	.....	Cultivated.
Dipterocarpeæ—		
Shorea robusta, Gaertn.	Salwa, sál ...	Forms gregarious forest in places.
Malvaceæ—		
Kydia calycina, Roxb.	Kopasia ...	Hill forests and with sál.
Bombax malabaricum, DC.	Simuri ...	Common.
Sterculiaceæ—		
Sterculia urens, Roxb. ... ... * ...	Bhendia nandan	Dry rocky hills.
Helicteres Isora, Linn.	Muri-muri ...	Common
Pterospermum suberifolium, Lam.	Giringa ...	A handsome small tree, common on hill slopes.

Name	Uriya name	Remarks
Tiliaceæ—		
Grewia tiliæfolia Vahl	Dhaman	
,, salvifolia Heyne	Dhattiki	Chiefly on laterite
,, sclerophylla, Roxb	Nalnaluka	Small shrub
,, (?)	Ditto	Small tree, hills
Malpighiaceæ—		
Hiptage Madablota, Gaertn	Boromali	Climber
Geraniaceæ—		
Averrhoa Carambola Linn		Cultivated
Rutaceæ—		
Toddalia aculeata Pers	Tundupara	Thorny climber
Glycosmis pentaphylla Correa	Chouldua	Common shrub
Limonia acidissima, Linn	Bheuta	Common small tree, especially on laterite
Atalantia monophylla Correa	Narguni	Common thorny shrub
Ægle Marmelos, Correa	Bel	Very common everywhere
Citrus medica Linn		Cultivated
Citrus Aurantium Linn	,,	Ditto
Simarubeæ—		
Ailanthus excelsa DC	Mahanim, Mahalo	Common large tree wood used to make catamarans and masula boats
Ochnaceæ—		
Ochna squarrosa, Linn	Koniari	Small tree, hills
Burseraceæ—		
Garuga pinnata, Roxb		Not common, bamboo forests
Bursera serrata, Colebr	Sarupotri mongai	Valleys and along streams
Meliaceæ—		
Melia indica, Brandis	Nim	Common probably self sown
,, Azedarach Linn		Cultivated
Cipadessa fruticosa, Bl	Nalbila	Small tree common
Aglaia Roxburghiana, Miq		Hill fruits
Soymida febrifuga, Adr Juss	Suam	Common, chiefly in sál forests
Chloroxylon Swietenia, DC	Bheru	Scarce
Cedrela Toona, Roxb	... ,,	
Olacineæ—		
Olax scandens Roxb	Bodabodoria	Climber
Celastrineæ—		
Colastrus emarginatus, W and A	Bali bhains ,,	Thorny shrub
,, paniculatus Willd	,,	Common climber
Elæodendron Roxburghii, W and A		Scarce
Rhamneæ—		
Zizyphus Jujuba Lam	Bora koli	Cultivated and run wild
,, vulgaris, Lam	Gota	Thorny shrub, common
,, Œnoplia Willd	Kontai kori	Climbing thorny shrub
,, rugosa Lamk	Gotokai Ditto	ditto
Ventilago calyculata, Tul	Raktopit	Climber
Gouania leptostachya DC	Ramduri	Ditto
Ampelideæ—		
Leea staphylea, Roxb	Kortia	Small tree valleys on N slopes of hills
Sapindaceæ—		
Schleichera trijuga, Willd	Kusam	Cultivated
Nephelium Litchi Camb		Ditto.
Dodonœa viscosa Linn	,,	Cultivated and apparently wild in the Coast forests.
Anacardiaceæ—		
Mangifera indica Linn	Am	Cultivated
Anacardium occidentale, Linn	Lunka am	Ditto
Buchanania latifolia, Roxb	Chara	Common in sál forests
Odina Wodier Roxb	Moi	Common, valued for house posts
Semecarpus Anacardium, Linn f	Bhalia	Common
Spondias mangifera Pers	Ambada	
Moringeæ—		
Moringa pterygosperma, Gaertn		Cultivated
Leguminosæ—		
Indigofera pulchella, Roxb.		Shrub
Millettia auriculata Baker		Climber, hills
Sesbania ægyptiaca, Pers		Cultivated
Abrus precatorius, Linn	Kaincho	Climber
Mucuna pruriens, DC		Ditto
Erythrina Indica, Lam	Paldua	Common tree
Spatholobus Roxburghii, Bth		Climber
Butea frondosa, Roxb	Kuntiparas	Rather scarce
,, superba Roxb	Lota phalat	Climber
Pueraria tuberosa DC		Ditto
Flemingia strobilifera, Roxb		
Ougeinia dalbergioides, Bth	Bandhan	Forest undergrowth
Dalbergia latifolia Roxb	Sissu	Scattered, but not very common
,, lancecolaria Linn	Chakundia	Scarce
,, volubilis Roxb	Nubari	Climber
Pterocarpus Marsupium Roxb	Pisál	Scattered throughout the country
Pongamia glabra Vent	Koronj	Near streams
Derris scandens, Bth	Kunchuna	Climber

Name	Uriya name.	Remarks
Leguminosæ—concluded		
Mezoneurum cucullatum, W & A		Climber, very thorny
Cæsalpinia sepiaria, Roxb	Gilo	Ditto ditto
,, Bonducella, Roxb	Munda gila	Ditto ditto.
Poinciana regia, Bojer		Cultivated
Cassia Fistula, Linn	Sonari	Common
,, siamea, Lamk		Cultivated
Bauhinia variegata Linn		Scarce, often cultivated
,, malabarica, Roxb	Gourubati	Scarce
,, Vahlii, W and A		Climber
Tamarindus Indica, Linn	Tentul	Cultivated, especially near Chilka lake
Saraca Indica, Linn	Asaka	Hill forest, seemingly wild
Entada scandens, Bth	Osta	Not very common, bark sold.
Adenanthera pavonina Linn	Manjari	Cultivated and probably also wild
Dichrostachys cinerea, W and A	Somi	Bamboo forests, especially near Chilka lake
Mimosa rubicaulis, Linn	Kerketi	Common thorny shrub
Xylia dolabriformis Bth	Kongora	Local Forms forest near Chandaka
Acacia Catechu, Willd	Khair	Not very common
,, cucophlœa, Willd	Goira	Common, on laterite especially
,, Farnesiana, ,,		
,, Intsia, ,,	Dolakonta	Common thorny climber
,, pennata ,,	Konta	Ditto ditto
Albizzia Lebbek Bth	Tinia	Not uncommon in bamboo forests
,, procera, ,,	Do	Bamboo forest chiefly
Pithecolobium Saman		The rain tree, cultivated
Ceratonia siliqua, Linn		The carob tree, cultivated
Combretaceæ—		
Calycopteris floribunda Lamk		Low hill forests
Terminalia belerica, Roxb	Bahera	Sal, bamboo and hill forests
,, Chebula, Retz	Harra	Hill forests
,, Catappa, Linn		Cultivated
,, tormentosa, W & A	Asan	Sál and bamboo forests
Combretum decandrum, Roxb	Atundi	Extremely common climber
Anogeissus latifolia Wall	Dhau	Scarce, sál forests
,, acuminata, Wall	Phansi	Scarce
Gyrocarpus Jacquini, Roxb		Only once seen near Sonakalla
Myrtaceæ—		
Psidium Guava, Raddi		Cultivated
Eugenia Jambolana Lam	Jam	Common
,, Jambos, Linn		Cultivated
,, zeylanica, Wight (?)	Sagarabatna	Small shrub common
Barringtonia acutangala, Gaertn	Hinjara	Banks of streams
Careya arborea, Roxb	Kumbi	
Melastomaceæ—		
Melastoma malabathricum Linn	Gongai	Banks of streams
Memecylon edule, Roxb	Nirasa	Hill forests
Lythrariæ—		
Woodfordia floribunda, Salisb	Harwari	Sál forests chiefly
Lawsonia alba, Lam		Cultivated
Lagerstromia parviflora, Roxb	Sidha	Common
Samydaceæ—		
Casearia tomentosa, Roxb	Girari	Common
,, graveolens, Dalz	Kurungi	
Cornaceæ—		
Alangium Lamarcku, Thw	Dolanku, Ankula	Common, usually on laterite or dry hills
Rubiaceæ—		
Adina cordifolia, Hook f and Bth	Karam	Common
Stephegyne parvifolia, Hook f and Bth	Keri Kadam	Ditto
Hymenodictyon excelsum, Wall	Khanso	Ditto
Webera corymbosa, Willd	Jhanjhauka	Chiefly on laterite
Randia uliginosa, DC	Tolung	
,, dumetorum, Lam	Mohan	
Gardenia turgida, Roxb	Dhobelkirat	Chiefly on laterite and stony hills.
,, latifolia, Aiton	Kotrunga	Sál and bamboo forests
Plectronia didyma, Bth & H f		Not common Banks of streams.
,, parviflora, Roxb		Near the Chilka lake
Ixora parviflora, Vahl	Telakurwa, Dalsingha	Banks of streams chiefly
Pavetta indica, Smith	Kukumchalia	
Morinda exserta, Roxb	Achhu	
Myrsineæ—		
Ardisia solanacea, Willd (?)		Moist valleys
Ægiceras corniculata, Blanco		Banks of the Chilka lake
Embelia robusta, Bth & H f	Nunuma, nunumuka	Chiefly in sál forests
Sapotaceæ—		
Bassia latifolia, Roxb	Mohul	Chiefly in sál and bamboo forest, the flowers are not eaten
Mimusops indica, A DC	Khiro, Tolue, Bohul	Not common, usually near streams
,, Elengi, Linn		Cultivated
Sideroxylon tomentosum, Roxb	Kanta bohul	Hill forests

Name	Uriya name	Remarks
Ebenaceæ—		
Diospyros Melanoxylon Roxb	Kendhu	Common everywhere
,, Ebenum, Konig (P)	Talcha, Halada	Chiefly on laterite
,, Chloroxylon, Willd		Ditto
,, Embryopteris, Pers	Makar kendhu	Common near streams
Maba buxifolia, Roxb	Guakoli	Very common on laterite and on hot dry hills
Oleaceæ—		
Nyctanthes Arbor tristis, L	Gongoshooli	Scarce
Jasminum scandens, Willd.	Lohibera	
Apocyneæ—		
Carissa Carandas, Linn	Kerendo kuli	Hill forests.
,, diffusa, Roxb	Anka kuli	Common everywhere, especially on laterite
Holarrhena antidysenterica, Wall	Pita korwa	Very common
Thevetia nerifolia, Pers		Cultivated
Alstonia scholaris, R Br	Chhatiana	Kohori forests
Asclepiadeæ—		
Calotropis gigantea, R Br	Uruk	Very common
Loganiaceæ—		
Strychnos Nux-vomica, Linn	Kuchila	Very common, wood used for house-posts, seeds are collected and sold
,, potatorum, ,,	Kotoko	Found in Banpur; wood used for plough heads
Borragineæ—		
Ehretia lævis, Roxb.	Mosonea	Kohori forests
,, buxifolia, Willd		Common near Tangi
Convolvulaceæ—		
Erycibe paniculata Roxb		Climber
Argyreia speciosa, Sweet		Ditto
Bignoniaceæ—		
Millingtonia hortensis, Linn		Cultivated
Oroxylum indicum, Bth	Phunphuna	Common
Stereospermum chelonoides, DC		Not common
,, suaveolens, DC	Patúli	Ditto
Acanthaceæ—		
Adhatoda Vasica, Nees	Basung	Mango topes
Barleria longiflora, Willd		Hot dry rocks near the lake
Verbenaceæ—		
Callicarpa arborea, Roxb	Boroputri	Hill forests
Tectona grandis, Linn f		Cultivated, nowhere wild
Gmelina arborea, Roxb	Gambhari	Not common
Premna latifolia. ,,	Agabathu	
Vitex Negundo, Linn	Beyguna	Cultivated and run wild
,, pubescens, Vahl	Muria	Sál and bamboo forests
,, arborea Roxb	Phulmuria	Hill forests
Clerodendron infortunatum, Linn	Anguti	Waste places
Nyctagineæ—		
Pisonia aculeata, Linn.	Hatiankusa	Very common thorny climber
Lauraceæ—		
Actinodaphne angustifolia, Nees	Jharchampa	Moist slopes in hills
Loranthaceæ—		
Loranthus longiflorus, Desr		Common
Urticaceæ—		
Streblus asper, Lour	Sahara	Extremely common everywhere
Plecospermum spinosum, Trecul	Banabana	Common, especially on laterite
Phyllochlamys spinosa, Bureau	Jhumpri	Thorny small tree of hills, leaves eaten
Artocarpus integrifolia, Linn		Cultivated
,, Lakoocha, Roxb		Ditto
Ficus bengalensis, Linn	Bor	Planted chiefly
,, infectoria, Willd	Jari	Ditto
,, religiosa Linn	Do	Ditto
,, retusa Linn	Baha jari	
,, glomerata Roxb		
,, hispida, Linn f		Moist places
Ulmus integrifolia, Planch	Daurango	Common in bamboo forest
Sponia orientalis, Planch		
Euphorbiaceæ—		
Phyllanthus Emblica, Linn	Onra	Sál and bamboo forests
,, lanceolarius, Mull Arg	Kalchua	Common everywhere
Bridelia retusa Spr	Kasi	Sál forest chiefly
,, stipularis, Bl	Gour kasi	Common
Lebedieropsis orbicularis, Mull Arg	Korera	Bamboo forest.
Croton caudatus Mull Arg	Wusta	Common, used to tie rafters
Trewia nudiflora Linn.	Monda	
Mallotus philippinensis, Mull Arg	Gundi	Very valuable tree in Orissa, the dye is largely collected for sale.
Macaranga peltata, Mull Arg	Pianta	Hill forests
Ricinus communis, Linn		Cultivated
Homonoya riparia, Lour	Pani begunia	Beds of streams
Jatropha Curcas Linn		Used for fencing
,, glandulifera, Roxb		Waste places everywhere

Name.	Uriya name.	Remarks.
Euphorbiaceæ—concluded.		
Gelonium multiflorum, A. Juss.	Kakra, Halada	Common in almost all forests.
„ lanceolatum, Willd.	Poichalia ...	Ditto ditto.
Euphorbia Tirucalli, Linn.	Hari seju ...	Dry rocky hills.
„ Nivulia, Ham.	.....	Very common everywhere.
„ Antiquorum, Linn.	.....	Commonly used for fencing.
„ Cattimandoo, Elliot	.....	Dry rocky hills near Chilka lake.
Cycadaceæ—		
Cycas circinalis, Linn	Rongua ...	Chiefly in sál forests.
Palmæ—		
Borassus flabelliformis, Linn.	.....	Cultivated.
Phœnix sylvestris, Roxb.	.....	Ditto.
„ acaulis, „	Khajar ...	Very common.
Caryota urens, Linn.	.....	Cultivated on Burnai hill.
Areca Catechu, „	.....	Cultivated.
Cocos nucifera „	.....	Ditto.
Calamus fasciculatus, Roxb.	.....	Very common everywhere and especially in mango topes.
Pandaneæ—		
Pandanus odoratissimus, Willd.	Kesura ...	Chilka lake; good elephant chara.
Gramineæ—		
Bambusa arundinacea, Retz	Kanta bans ...	Extremely common.
„ Tulda, Roxb.	Sundragai ...	Cultivated, wild in mál forests.

Demands for Produce.

36. The demand for forest produce from the Khoordah forests seems at first sight to be, as far as can be ascertained, greater than the forests can safely supply in their present condition, but with careful management and protection they can doubtless be made hereafter fully to supply the requirements of the estate itself, and to give besides a very considerable amount of material for export. The present demand consists—

1*st*.—In the demand for material for the use of the ryots of the estate. This material consists in the firewood required for the villages, for in Orissa firewood and not dried cowdung is the usual fuel; in posts, rafters and bamboos for the construction of houses, in stakes and brushwood for fencing; and in wood for the construction of carts and domestic and agricultural implements.

2*nd*.—In the demand for material for export to the parts of the Pooree district outside the estate as well as the town and district of Cuttack (the town of Cuttack is only four miles distant from the northern edge of the Khoordah forests). This demand principally consists in firewood, charcoal, bamboos and cane.

37. The amount of the demand on the Khoordah forests may be thus estimated. The number of houses in the estate requiring firewood may be estimated at 60,000. Each of these houses burns on an average about 10 maunds per month, or 120 maunds in the year, making an amount of firewood required from the forests of 7,20,000 maunds. As regards the amount of firewood usually required for sale to the station and districts of Cuttack and Pooree, it can only be roughly estimated at about 50,000 maunds. Total firewood yearly in demand 7,70,000 maunds. The demand for charcoal may be rated at about 6,000 maunds, or at the rate of five maunds of wood per maund of charcoal, most of the wood used being small, 30,000 maunds of firewood, raising the total yearly demand for firewood to 8,00,000 maunds. The demand for house-posts is at the rate of about 1,20,000 per year, or approximately 15,000 maunds.

38. The demand for bamboos both for use in the estate and for export may be estimated at about 2,00,000 at present, a very small amount compared to the probable possible supply.

39. The yearly demand for cane amounts to more than that for bamboos. The revenue is about Rs. 130 collected on cane, at the rate of eight annas per kahun of 1,280 canes, or about 3,30,000 canes per year.

40. *Probable yearly supply.*—Taking the area of the Khoordah forests at 400 square miles, or 256,000 acres, we can very roughly divide the areas as follows:—

	Acres.
Sál forests	5,000
Bamboo	65,000
Mixed	186,000
Total ...	256,000

41. The *sál area* is all quite young, but is still capable of giving a considerable number of poles from thinnings which can be made of badly shaped trees. If these thinnings are regularly made every 10 years, an area of 500 acres per year can be so thinned, and may be expected to yield about 100 poles of sál and its accompanying trees, at any rate at the first thinning, per acre, besides a quantity of firewood. It must be borne in mind that though I think these thinnings will have a most beneficial effect on the forest as inducing the growth of straight stems fit eventually to give timber, instead of the present growth, usually from old trees cut at three feet or so from the ground, yet protection from fire is indispensable to success. But I think this protection *can* be assured, and do not therefore hesitate to recommend these thinnings which are similar to the improvement fellings of the Central Provinces. The subject will be treated more in detail in a future chapter.

42. The *bamboo forests* are only about half grown, so that we can only estimate half the area as fit for cutting. On this area we can suppose at least 10 clumps of bamboo per acre, yielding 40 bamboos. Thus the bamboo forests may be expected to yield, with the scattered localities added, 16 lakhs of bamboos yearly, a very considerably larger amount than is actually sold. It must be borne in mind that the bamboo forests are still young, and should not, for a few years yet, be too heavily worked.

43. From the *remainder of the forests* covering the large area of 186,000 acres, the firewood and timber supply must be drawn. As before stated, nearly the whole of this area is covered with very young and small forest, and its yield is consequently not great; but if we consider it to be at present equivalent to a yearly yield of only four maunds per acre, we may expect to be able to supply 7,44,000 maunds, which is somewhat less than the demand. But the remainder is made up by the firewood procurable from thinnings of the sál forests and from the yearly yield of the trees growing among the bamboos. The very numerous mango and other fruit trees so common throughout the district will also assist this supply, so that it cannot be said that at present the demand is greater than the probable annual yield. The question of the estimated yield of the forests will, however, be again referred to.

44. *Grazing.*—The present unsatisfactory state of the Khoordah forests, especially on the level lands near the villages, is principally due to unrestrained and indiscriminate grazing. No charge for grazing has been as yet made either for cattle belonging to ryots of the estate or to cattle from outside. Every village possesses a certain amount of cattle, partly bullocks used for cultivation and carts and for the production of manure, partly buffaloes used for carting and to provide milk and ghee; and the Forest Officers estimate the total number of head of cattle at present grazing in the Khoordah forests at not less than 50,000 belonging to ryots and 12 to 15,000 belonging to outsiders. The damage done by this large number of cattle is very great, and any measures taken with the object of regenerating or improving the crop of forest, must be taken with especial consideration of the necessity for the restriction of grazing on these areas.

45. As already explained, the condition of the Khoordah forests is for the most part that of scrub jungle cut and hacked and browsed over indiscriminately. In some parts scarcely a tree, seedling or shoot shows itself above ground but it is eaten down, and in this way proper reproduction is almost impossible; and when it is considered that the lands near the villages are exposed both to continual cutting for firewood and to constant grazing, it is easy to understand that, without some strong measures, the condition of these lands is not likely to improve.